CLIMATE PROGRAM OFFICE

Ocean Climate Observation Program

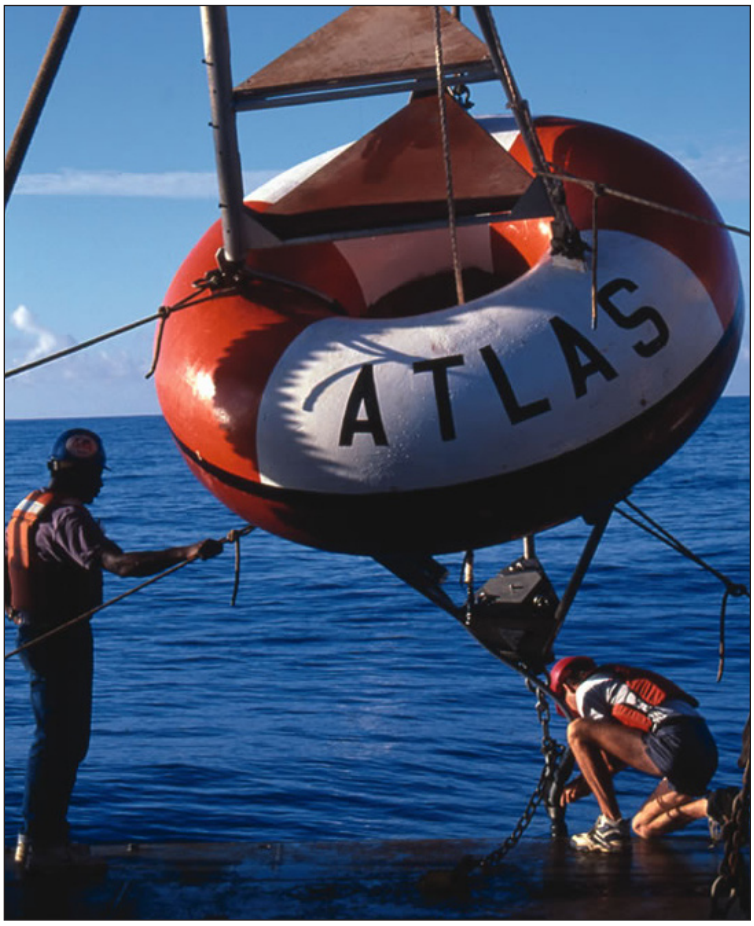
The ocean moderates global temperature and atmospheric carbon dioxide, and plays a critical role in sea level rise, drought, and tropical cyclones. How can we characterize the state of the global ocean in enough detail to understand its influence on climate variability and change?

The Ocean Climate Observation (OCO) Program sustains a global ocean observing system to measure a range of important ocean parameters. The program builds and maintains the in-water network of ocean observations around the world, managing the responsibility for NOAA's contribution to the International Ocean Observing System. OCO supports the advancement of climate science by providing observational data for the climate research, modeling, and forecasting communities. OCO also contributes to scientific climate assessments such as the Intergovernmental Panel on Climate Change (IPCC).

Every sector of society is affected by the ocean, either directly or indirectly. OCO provides benefits by delivering reliable observations that facilitate effective decision-making on climate-related issues. The OCO observing network also supports global and coastal weather prediction, marine services, military applications, tsunami warning systems, and marine environmental monitoring. The majority of OCO's work is accomplished by scientific partners in NOAA labs and Cooperative Institutes.

OCO Objectives

The Ocean Climate Observation program provides the observational foundation required to understand and forecast a range of climate conditions.



Technicians deploy a moored buoy in the Pacific Ocean to improve El Niño predictions.

Observational data gathered through OCO include:

- Rate of air-sea exchange of carbon dioxide,
- Ocean acidity,
- Regional and global sea level rise,
- Ocean circulation effects on regional temperature trends and extremes,
- Regional patterns in extremes of drought and rainfall, and
- Frequency and intensity of tropical cyclones.

Ocean Climate Observation Program http://www.oco.noaa.gov

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Why do we need ocean observations?

The following examples illustrate some of the value that ocean observations provide in the ongoing study of the climate system:

- Observed sea level is currently rising faster than projected by models used for the IPCC. Models will require observational data at higher spatial and temporal resolutions to dramatically improve their accuracy for the purposes of forecasting, mitigation, and adaptation.
- Monitoring global sea surface temperature is fundamental to predicting events related to the El Niño Southern Oscillation.
- Oceanic currents such as the Gulf Stream are major contributors to global ocean circulation, transporting heat from the tropics to higher latitudes, and thus shaping the climate of North America.
- The Indian Ocean has a significant influence on global atmospheric circulation, transporting large amounts of heat and moisture. This influence is felt in North America, quite probably impacting drought in the western United States.
- Monitoring sea-surface salinity is necessary for evaluating and predicting the evolution of marine ecosystems habitats, and for understanding and monitoring global precipitation and evaporation.
- International policy and national economic decisions require accurate measurements of ocean-based sources and sinks of carbon dioxide.

The OCO supports ongoing work to build, maintain, and operate a range of interdependent observing networks, represented by symbols on the map above. From lower left to upper right, the photographs illustrate Dedicated Ships, Ships of Opportunity, Ocean Reference Stations, Tide Gauge Stations, Arctic Observing Systems, Tropical Moored Buoys, Surface Drifting Buoys, Argo Profiling floats, and Continuous Satellite Missions for sea surface temperature, sea surface height, surface vector winds, ocean color, and sea ice. Not illustrated are the Data & Assimilation Subsystems and Product Delivery. Though satellites are a critical element of this composite system, they are managed by other programs in NOAA and NASA. The initial observing system is 60% complete, measured against targets of the international Global Climate Observation System Implementation Plan. This current level is not yet adequate to meet growing requirements for accurate assessment and prediction of climate change.